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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,609	12/03/2003	Frank Edughom Ekpar		2486

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FRANK EDUGHOM EKPAP  
DAIANJI DANCHI 3-202  
MINAMI NARAHARACHO 20-15-5  
FUKUI CITY, 910-0046  
JAPAN

EXAMINER
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WANG, KENT F

ART UNIT	PAPER NUMBER
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2609

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/16/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/728,609

Applicant(s)

EKPAR, FRANK EDUGHOM

Examiner

Kent Wang

Art Unit

2609

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 December 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Observation***

1. Claims 1, 3, 9, 10, 24, 26, 32, and 33 recite the limitation "optional" or "optionally". The limitations recited after the word "optional" or "optionally" to claims 1, 3, 9, 10, 24, 26, 32, and 33 has not been further treated on the merits because "optional" is an act of choice. It is not necessary to have those limitations after the word "optional".

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 7-8, 10, 18-19, 22, 24-26, 30-31, 33, 41-42, and 45 are rejected under 35 U.S.C. § 102(b) as being anticipated by Henley, US 5,657,073.

Regarding claim 1, Henley discloses an apparatus for creating, managing and publishing interactive virtual tours (i.e. panoramic imaging with distortion correction and selectable field of view), the apparatus comprising:

- a panorama data acquisition unit (i.e. a plurality of video cameras  
10) implementing means of capturing panoramic data and  
preparing panoramic data for further processing (see column 2, line  
54 to column 3, line 5);

- a transform engine (an image transformation engine 16) responsive to panoramic data (i.e. data capture from cameras 10) and implementing correcting distortions in panoramic data (see column 4, lines 41 – 48);
- a viewing engine (i.e. image clipper device 20) responsive to panoramic data and implementing perspective correction (see column 4, lines 48 – 55);
- a display (display device 30) for rendering output of viewing engine, transform engine, and panoramic data acquisition unit (see column 4, lines 54 – 61).

Regarding claim 2, Henley teaches a panoramic data acquisition unit (i.e. a plurality of video cameras 10) is adapted to capture data representing panoramic images or video (see column 4, lines 22 – 33).

Regarding claim 3, Henley teaches a panoramic data acquisition unit (i.e. a plurality of video cameras 10) comprises at least one versatile device (i.e. the multi camera assembly 10, a lens assembly 11, and a housing 12) for creating representations of stimuli covering substantially all directions around a given view point comprising at least one grid of one or more sensor elements disposed on an N-dimensional and arbitrarily shaped surface (see column 4, lines 22 – 33). Since video cameras (10) of Henley is a digital camera (see column 2, lines 13 – 16), it would have had CCD sensor elements arranged in the two dimensional matrix within the shaped surface.

Regarding claim 7, Henley teaches a panoramic data acquisition unit (video cameras 10) is adapted to capture each complete panoramic data block (e.g. block data field, V1) in a single image/video frame (see column 4, lines 33 - 57).

Regarding claim 8, Henley teaches a panoramic data acquisition unit (a plurality of video cameras 10) is adapted to capture each complete panoramic data block in a plurality of image/video frames that are combined to form complete panoramic data blocks (V1 – V4, OV12 – OV41) (i.e. a single image of the 360 degree panoramic or panospheric field of view collected by the multiple cameras; see Figure 2 and also see column 4, lines 33 - 57).

Regarding claim 10, Henley teaches a panoramic data acquisition unit (a plurality of video cameras 10) further comprises of preparing and transferring all or portions of acquired panoramic data to transform engine, viewing engine, or display (e.g. the data streams 14, as shown entering the image transformation engine 16 and exit as a data stream 18, which is directed into an image clipper device 20, as shown in Figure 2; see column 4, lines 33 – 57).

Regarding claim 18, Henley teaches an image transformation engine (16) being responsive to user input (joystick) and implements for perspective correction of panoramic data (i.e. remove distortions generated by the image capturing process; see column 4, lines 34 – 57).

Regarding claim 19, Henley discloses the viewing engine (20) further implements of navigating panoramic data (i.e. controlled by a pan-tilt-rotation-zoom controller means 22; see column 4, lines 34 – 57).

Regarding claim 22, Henley teaches the representative information rendered by control engine (i.e. virtual reality display system) about all or parts of virtual tour is rendered in 2D, 3D or higher dimensional space and/or time (i.e. three dimensional viewing or stereoscopic imaging; see column 4, lines 58 – 67).

Regarding claims 24-26, 30-31, 33, 41-42, and 45, these nine claims are method claims corresponding to apparatus claims 1-3, 7-8, 10, 18-19, and 22. Therefore, method claims 24-26, 30-31, 33, 41-42, and 45 are analyzed and rejected as previously discussed with respect to apparatus claims 1-3, 7-8, 10, 18-19, and 22.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4, 5, 27, and 28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Henley, US 5,657,073 in view of Tanida, US 7,009,652.

Regarding claims 5 and 28, note the discussion of Henley above. Henley does not mention comprises at least one grid of one or more photosensitive elements on a surface with a spherical geometry. In same field of endeavor (video camera), Tanida teaches a well-known video camera which has a multiplicity of photosensitive pixel elements array on a spherical surface (see column 2, lines 22 – 24). It would have been obvious to one of the ordinary skill in the art at the time the invention was made to have provided a multiplicity of photosensitive elements placed on spherical surface as taught by Tanida to the camera or acquisition unit of Henley because the arrangement of photosensitive elements on spherical surface of Tanida would obtain a high resolution image (see column 2, lines 11 – 24 of Tanida).

As to claims 4 and 27, Tanida clearly teaches sensor elements (i.e. photosensitive elements) responsive to electromagnetic radiation (i.e. light beam) (see column 4, lines 15 – 17).

6. Claim 6 and 29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Henley, US 5,657,073 in view of Keast, US 5,721,585.

Regarding claims 6 and 29, note the discussion of Henley above. Henley discloses the field of view of all of the cameras collectively captured is a complete 360-degree panoramic field of view. Henley, however, fails to specifically disclose a vertical field of view that is usually less than 180 degrees. Keast teaches an image system provides both a 180-degree vertical view and a 360-degree azimuthal view (see column 5, lines 16 - 28, and column 6, lines 54 –

67). It would have been obvious to one of ordinary skill in the art at the time invention was made to have added the 180-degree vertical view as taught by Keast to the panoramic field of view of Henley because both 180-degree vertical field of view and 360-degree panoramic field of view would provide a complete and uniform imaging of the sphere of view (column 5, lines 16 – 29).

7. Claims 9, 14-16, 20-21, 23, 32, 37-39, 43-44, and 46 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Henley, US 5,657,073 in view of Jackson et al., US 5,990,941.

Regarding claim 9, note the discussion of Henley above. Henley discloses an imaging system for the production of virtual tour data includes in either a still image or a video format (see column 2, lines 9 – 11). Henley, however, fails to specifically disclose to resources on local and distributed networks. Jackson teaches the ability to delivery these image data, still or full motion video via broadcast, cable, digital network such as Internet, or on transportable media such as CD-ROM, videotape, or laserdisc from a remote site 12 to a local site 14. It would have been obvious to one of ordinary skill in the art at the time invention was made to have added ability to delivery these image data as taught by Jackson to the imaging system of view of Henley because this feature provides the spherical image can be transmitted to multiple users at local locations (column 10, lines 12 - 27).

Regarding claim 14, Jackson teaches a package generator implement specifying active regions on panoramic data. Jackson teaches a so-called "hot



spots", as disclosed in column 4, lines 3 - 7, that are identified by a user as the user interacts with the stored data files representing the images.

Regarding claim 15, Jackson teaches to specify the navigable paths for interactive display of any portion of a spherical image, as disclosed in column 4, lines 8 - 10.

Regarding claim 16, Jackson teaches that the end user could utilize the navigable paths or walk-through sequences are navigated in automatic or guided mode (i.e. controls the direction of viewing by moving a computer mouse; see Figure 9 and also column 8, lines 16-31).

Regarding claims 20 and 21, Jackson teaches a viewing engine implements means for a single user or a plurality of users to independently and simultaneously interact with and navigate panoramic data (see column 8, lines 16 - 31 and column 10, lines 12 - 27).

Regarding claim 23, Jackson teaches the view engine and control engine comprising a unitary structure (microcomputer and control interface 15 as shown in Figure 1).

Claims 32, 37-39, 43-44, and 46 are method claims. Thus, they are analyzed as previously discussed with respect to the apparatus claims 9, 14-16, 20-21, and 23 above.

8. Claims 11-13 and 34-36 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Henley, US 5,657,073 in view of Xiong, US 5,960,108.

Regarding claim 11, note the discussion of Henley above. Henley teaches the transform engine of claim 1, but doesn't teach conversion from one format. Xiong teaches the capability to convert the panoramic data from a first format to one or more formats and/or vice versa (i.e. conversion of 3D rays to 2D image, see Figure 2 and also column 4, lines 34 – 45). It would have been obvious to one of the ordinary skill in the art at the time the invention was made to have included the panoramic data conversion as taught by Xiong to the transform engine of Henley because it allows an arbitrarily large field of view (see column 4, lines 54 – 56 of Xiong).

Regarding claim 12, Xiong teaches that the panoramic data conversion is between different coordinates (an ordinary rectilinear lens is projection from a 3D ray to a 2D image position; see column 3, lines 12-24, column 4, lines 34-67, and column 6, line 1 - column 7 line 26).

Regarding claim 13, Xiong provides a plurality of images, each of the plurality of images including a plurality of parameters and optimizing the plurality of parameters for each of the plurality of images in accordance with a set of distortion functions that is based on a set of polynomials of suitable degree (i.e.  $r = c_1\theta + c_2\theta^2 + c_3\theta^3 + \dots$ , where the order of polynomial can be determined experimentally, see column 4, lines 34-67).

Regarding claims 34-36, these claims are method claims and analyzed as previously discussed with respect to the apparatus claims 11-13 above.

9. Claims 17 and 40 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Henley, US 5,657,073 in view of Smith, US 6,226,658.

Regarding claims 17 and 40, Smith teaches a layout code tuning in universally readable document files. More specifically, as disclosed in column 2, lines 28 - 46, Smith discloses a system and method in which page layout code in so-called "universal" document file formats is customized to make the file format more universally compatible across a spectrum of different manufacturers. It would have been obvious to one of the ordinary skill in the art at the time the invention was made to have included the universally readable document files as taught by Smith to the imaging system of Henley because this feature makes it possible for arbitrary types and numbers of elements to be managed by universal file format.

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Iwaki et al. (US 2003/0197780) discloses an omnidirectional camera to provide image data having image conversion parameters written in an unphotographed area of an annular image shot by a PAL camera lens.
- Greguss (US 4,566,763) discloses a method and apparatus for a panoramic imaging block for three-dimensional space being suitable for pictorial recording and displaying of three-dimensional spaces based on the flat

cylindrical perspective and having reflecting and refracting surfaces to be described mathematical functions.

- Zimmermann (US 5,185,667) discloses a device for omnidirectional image viewing providing pan-and-tilt orientation, rotation, and magnification within a hemispherical field-of-view which produces a circular image of an entire hemispherical field-of-view, which can be mathematically corrected using high speed electronic circuitry.

### ***Inquiries***

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kent Wang whose telephone number is 571-270-1703. The examiner can normally be reached on 8:00 A.M. - 5:30 PM (every other Friday off).


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chanh Nguyen can be reached on 571-272-7772. The fax phone number for the organization where this application or proceeding is assigned is 571-270-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR

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system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kent Wang  
12 February 2007

  
CHANH D. NGUYEN  
SUPERVISORY PATENT EXAMINER